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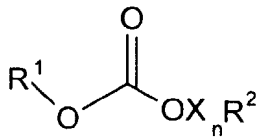
(54) Carbonates for the delivery of aldehydes and/or ketones

(57) The carbonates of formula I



(I)

deliver aldehydes and/or ketones in the presence of skin bacteria, enzymes or acidic or alkaline conditions. One carbonate molecule can provide one or more different compounds.

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Description

The present invention relates to carbonates for the delivery of aldehydes and/or ketones. These carbonates represent a new group of precursors for organoleptic compounds (such as fragrances, flavours and masking agents) and antimicrobial compounds.

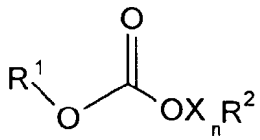
A principal strategy currently employed in imparting odours to consumer products is the admixing of the fragrance directly into the product. There are, however, several drawbacks to this strategy. The fragrance material can be too volatile and/or too soluble, resulting in fragrance loss during manufacturing, storage, and use. Many fragrance materials are also unstable over time. This again results in loss during storage.

In many consumer products it is desirable for the fragrance to be released slowly over time. Micro-encapsulation and inclusion complexes with cyclodextrins have been used to help decrease volatility, improve stability and provide slow-release properties. However, these methods are for a number of reasons often not successful. In addition, cyclodextrins can be too expensive.

Fragrance precursors for scenting fabrics being washed in the presence of a lipase-containing detergents are described in WO 95/04809. The fragrance precursors contained in the detergent and/or in the softener are cleaved by the lipase and a single odoriferous compound, either an odoriferous alcohol or aldehyde or ketone is yielded. Thereby a prolonged scenting effect on the fabric is obtained.

One object of the present invention is to provide new precursors for compounds with different activities. It is a preferred object of the present invention to provide compounds that can be cleaved under different activating conditions. A further object of the invention is to provide new compounds which are stable under transport and storage conditions. A further object of the present invention is to provide precursor molecules supplying different active compounds simultaneously or successively.

The present invention refers to carbonates of the formula I



(I)

wherein

R^1 represents the residue of the enol form of an aldehyde or ketone,

R^2 represents a saturated or unsaturated, substituted or unsubstituted C_1-C_{30} aliphatic residue with straight or branched chaines a saturated or unsaturated, substituted or unsubstituted carbocyclic or heterocyclic residue optionally having one or more heteroatoms in the chain, the residue of the enol form of an aldehyde or ketone, the residue of an alcohol or phenol, -COOY or -OCOOY, wherein Y is H, a metal atom or R^3, and R^3 is the rest of an alcohol or phenol R^3OH or has the same definition as R^1 and is the same or different as R^1,

X represents a saturated or unsaturated bivalent hydrocarbon residue with a straight or branched chain with 1 to 30 carbon atoms optionally containing one or more heteroatoms, and/or a group

and/or substituents of the formula -COOY, -OCOOY, -OH, -C=O, or -NH2 and Y is H, a metal atom or R^4, and R^4 is the rest of an alcohol or phenol R^4OH or has the same definition as R^1 and is the same or different as R^1 and

n is 0 or 1.

The heteroatoms in X and in R^2, representing a C_1-C_{30} aliphatic residue, may be O, N, S and/or P. The substituents of R^2, representing a C_1-C_{30} aliphatic residue, may be ionic such as $-NH_3^+$ or COO^-.

The compounds of formula I are not limited to any particular stereoisomers, all possible stereoisomers (E/Z isomers,

enantiomers, diastereomers) and all mixtures are thus included within the scope of the invention.

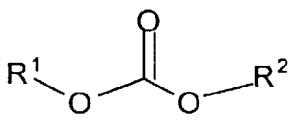
The compounds of formula I are virtually odourless under room temperature, atmospheric conditions and about 20 to 100 % relative humidity. However, under activating conditions, they are cleaved and one or more active compounds with organoleptic and/or antimicrobial properties are generated.

The activating conditions which lead to cleavage and the desired active compounds comprise the presence of skin bacteria, especially axilla bacteria, or an enzyme such as protease or lipase, elevated temperature or acidic or alkaline pH-values. The compounds of formula I, upon cleavage, provide aldehydes or ketones or both, with or without alcohol (s) having organoleptic and/or antimicrobial activity and therefore permit the development of useful consumer products with enhanced organoleptic and/or microbiological properties.

The compounds of the present invention can act as fragrance precursors in personal care products, in laundry products, cleaning compositions, pet care products and environment scents such as air fresheners. They can also act as flavour precursors in food, beverages and tobacco products. They can also act as precursors for odour masking agents in the same products as the fragrance precursors. They also can act as precursors for antimicrobial agents. The fragrance and the flavour precursors and the precursors for odour masking agents of the invention may be used individually in an amount effective to enhance or to mask the characteristic odour of a material. More commonly, however, the compounds are mixed with other fragrance components in an amount sufficient to provide the desired odour characteristics.

The precursors of formula I provide, upon cleavage, one active compound, if R^1=R^2 or R^1=R^3 and X does not yield a different active compound. However, a special advantage of the invention is that one precursor compound can provide also two or more different active compounds, thus enabling to prepare customized solutions for special uses. Two different active compounds are for example provided if R^1 and R^2 or R^1 and R^3 are different or if R^1=R^2 or R^1=R^3 and R^4 is different or X yields an active compound. Three different active compounds are provided if R^1, R^2 or R^3 and R^4 are different. More than three different active compounds may be generated by appropriate substituents of X.

Compounds of formula II

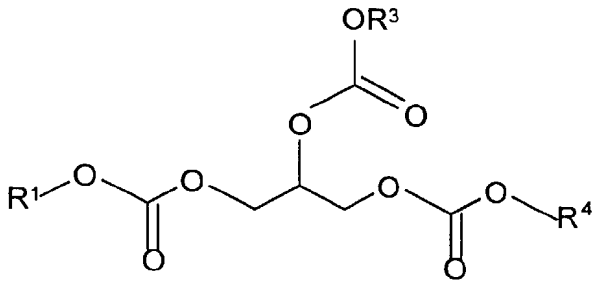


(II)

wherein R^1 is the residue of the enol form of an aldehyde or ketone and R^2 has the same definition as R^1 and may be the same or different, or R^2 is an alcohol or phenol or an alkyl residue, will yield one or two different active compounds.

Compounds of formula II, wherein R^1 and R^2 are derived from aldehydes, ketones, alcohols or phenols are advantageous, since the great part of the molecules results in active compounds. In compounds of formula II, wherein R^2 is an alkyl residue the latter can be costumized to provide useful characteristics for the application of the compounds. Such characteristics are for example, affinity to fibers for laundry applications or cosmetic properties for personal care products.

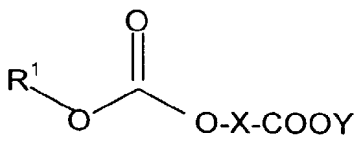
Compounds of formula III



(III)

wherein R^1, R^3 and R^4 have the meaning defined above, whereby R^1, R^2 and R^3 may be the same or different will yield up to three different active compounds.

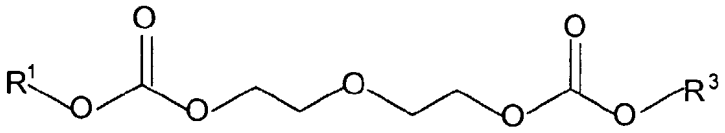
Compounds of formula IV



(IV)

wherein X represents a saturated or unsaturated bivalent hydrocarbon with a straight or branched chain with 1 to 20 carbon atoms and R^1 and Y have the same meaning as above, will yield up to two different active compounds.

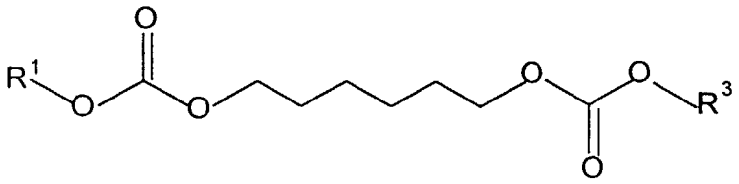
Examples of compounds of formula IV are those of formula V



(V)

wherein R^1 and R^3 are as defined above. They will yield up to two different active compounds.

Compounds of formula VI



(VI)

will yield up to two different active compounds.

Due to the in situ generation of the active compounds the desired effect is prolonged and the substantivity on different substrates is enhanced. If two or more active compounds are provided, they can be generated, depending on the precursor and/or the activating conditions, simultaneously or successively. Further, the precursors of the invention provide slow release of the active compounds.

Examples of aldehydes R^1HO, R^2HO, R^3HO and R^4HO include: 2,6,10-trimethylundec-9-enal*;undecanal; 1,2,3,4,5,6,7,8,-octahydro-8,8-dimethyl-2-napthalenecarboxaldehyde; tridecanal; 2-[4-(1-methylethyl)phenyl]-ethanal; 2,4-dimethyl-cyclohex-3-ene-1-carbox-aldehyde*; 4-carboxaldehyde-1,3,5-trimethyl-cyclohex-1-ene*; 1-carboxaldehyde-2,4-dimethyl-cyclohex-3-ene*; 1-carboxaldehyde-4-(4-hydroxy-4-methylpentyl)-cyclohex-3-ene*; 3,5,5-trimethylhexanal; heptanal*; 2,6-dimethyl-hept-5-eneal*; decanal**; dec-9-enal; dec-4-en-1-al; 2-methyldecanal*; undec-10-ene-1-al**; undecanal*; dodecanal**; 2-methyl-undecanal**; tridecanal; octanal**; nonanal*; 3,5,5-trimethylhexanal; undec-9-eneal**; 2-phenyl-propanal*; 4-methyl-phenyl acetaldehyde*; 3,7-dimethyl-octanal*; dihydrofarnesal**; 7-hydroxy-3,7-dimethyl-octanal*; 2,6-dimethyl-oct-5-ene-1-al; 2-(4,-(1-methylethyl)phenyl)-ethanal*; 3-(3-isopropylphenyl)-butanal**; 2- (3,7-dimethyoct-6-en-oxy)-ethanal; 1-carboxaldehyde-4-(4-methyl-3-penten-1-ly)-cyclohex-3-ene*; 2,3,5,5,-tetramethyl-hexanal; longifolic aldehyde; 2-methyl-4-(2,6,6-trimethylcyclohex-2-en-1-yl)-butanal*; 2-methyl-3-(4-tert-butylphenyl)propanal**; 4-(1,1-dimethylethyl)-benzenepropanal*; 2-[4-(1-methyl-ethyl)phenyl]-propanal; alpha-methyl-1,3-benzodioxole-5-propanal*; 3,7-dimethyl-oct-6-en-1-al*; 2-methyl-3-(p-isopropylphenyl)-propionaldehyde*; 4-(4-hydroxy-4-methyl-pentyl)-cyclohex-3-en-1-carboxaldehyde**; alpha-methyl-1,3-benzodioxole-5-propanal*; 1-carboxaldehyde-4-(1,1-dimethylethyl)-cyclohexane; 4-(octahydro-4,7-methano-5H-inden-5-ylidene)butanal; [(3,7-dimethyl-6-octenyl)oxy]-acetaldehyde** whereby * indicates the preferred aldehydes and ** indicate the more preferred aldehydes.

Examples of ketones R^1O, R^2O, R^3O and R^4O include:

2-heptyl-cyclopentanone; 2,2,6,10-tetrametyltricyclo-[5.4.0.0(6,10)]-undecan-4-one; benzylacetone*; carvone*; 1,2,3,5,6,7-hexahydro-1,1,2,3,3, -pentamentyl-4H-inden-4-one*; methyl heptenone*; dimethyl octenone*; 2-(butan-2-yl)-cyclohexanone*; 2-hexyl-cyclopent-2-en-1-one*; 2-(1-methylethyl)-5-methyl-cyclohexanone*; 2-

(2-methylethyl)-5-methyl-cyclohexanone*; 3-methyl-cyclopentadecanone; 4-tert-pentyl-cyclohexanone*; 3-oxo-2-pentyl-cyclopentaneacetic acid methyl ester**; 1-(1,2,3,4,5,6,7,8-octahydro-2,3,8,8-tetramethyl-2-naphthalenyl)-ethanone*; 3-methyl-5-propyl-cyclohex-2-en-1-one*

whereby * indicates the preferred ketones and ** indicate the more preferred ketone.

Examples of alcohols R^2OH, R^3OH and R^4OH are primary, secondary and tertiary alcohols and phenols such as:

amyl alcohol; hexyl alcohol*; 2-hexyl alcohol*; heptyl alcohol*; octyl alcohol*; nonyl alcohol*; decyl alcohol*; undecyl alcohol*; lauryl alcohol*; myristic alcohol; 3-methyl-but-2-en-1-ol*; 3-methyl-1-pentanol; cis-3-hexenol*; cis-4-hexenol*; 3,5,5-trimethyl hexanol; 3,4,5,6,6-pentamethylheptan-2-ol*; citronellol*; geraniol*; oct-1-en-3-ol; 2,5,7-trimethyl octan-3-ol ; 2-cis-3,7-dimethyl-2,6-octadien-1-ol; 6-ethyl-3-methyl-5-octen-1-ol*; 3,7-dimethyl-oct-3,6-dienol*; 3,7-dimethyloctanol*; 7-methoxy-3,7-dimethyl-octan-2-ol*; cis-6-nonenol*; 5-ethyl-2-nonanol; 6,8-dimethyl-2-nonanol*; 2,2,8-trimethyl-7(8)-nonene-3-ol ; nona-2,6-dien-1-ol; 4-methyl-3-decen-5-ol*; dec-9-en-1-ol; benzylalcohol; 2-methyl undecanol; 10-undecen-1-ol; 1-phenyl ethanol*; 2-phenyl ethanol*; 2-methyl-3-phenyl-3-propenol; 2-phenyl propanol*; 3-phenyl propanol*; 4-phenyl-2-butanol; 2-methyl-5-phenyl pentanol*; 2-methyl-4-phenyl-pentanol*; 3-methyl-5-phenyl-pentanol*; 2-(2-methylphenyl)-ethanol*; 4-(1-methylethyl)benzene methanol; 4-(4-hydroxyphenyl)-butan-2-one*; 2-phenoxy ethanol*; 4-(1-methylethyl)-2-hydroxy-1-methyl benzene; 2-methoxy-4-methyl phenol; 4-methyl phenol; anisic alcohol*; p-tolyl alcohol*; cinnamic alcohol*; vanillin*; ethyl vanillin*; eugenol*; isoeugenol*; thymol; anethol*; decahydro 2-naphthalenol; borneol*; cedrenol*; farnesol*; fenchyl alcohol*; menthol*; 3,7,11-trimethyl-2,6,10-dodecatrien-1-ol; alpha ionol*; tetrahydro ionol*; 2-(1,1-dimethylethyl)cyclohexanol*; 3-(1,1-dimethylethyl)cyclohexanol*; 4-(1,1-dimethylethyl)cyclohexanol*; 4-isopropyl cyclohexanol; 6,6-dimethyl-bicyclo [3.3.1]hept-2-ene-2-ethanol; 6,6-dimethyl-bicyclo[3.1.1]hept-2-ene-methanol*; p-menth-8-en-3-ol*; 3,3,5-trimethyl cyclohexanol; 2,4,6-trimethyl-3-cyclohexenyl-methanol*; 4-(1-methylethyl)cyclohexylmethanol*; 4-(1,1-dimethylethyl)cyclohexanol; 2-(1,1-dimethylethyl)-cyclohexanol; 2,2,6-trimethyl-alpha-propyl cyclohexane propanol*; 5-(2,2,3-trimethyl-3-cyclopentenyl)-3-methylpentan-2-ol*; 3-methyl-5-(2,2,3-trimethylcyclopentyl-3-enyl)pent-4-en-2-ol*; 2-ethyl-4 (2,2,3-trimethylcyclopentyl-3-enyl)but-2-en-1-ol*; 4-(5,5,6-trimethylbicyclo[2.2.1]hept-2-yl)-cyclohexanol*; 2-(2-methylpropyl)-4-hydroxy-4-methyl-tetrahydropyran*; 2-cyclohexyl propanol*; 2-(1,1-dimethylethyl)-4-methyl cyclohexanol*; 1- (2-tert-butyl-cyclohexyloxy) -2-butanol*; 1-(4-isoporpyl-cyclohexyl)-ethanol*; 1-(4-hydroxyphenyl)butan-3-one; 2,6-dimethyl-oct-7-en-2-ol*; 2,6-dimethylheptan-2-ol*; 3,7-dimethyl-octa-1,6-dien-3-ol* etc.

* indicates preferred alcohols

It is a matter of course, that it is not possible to give a complete list of the organoleptic especially odoriferous and/or antimicrobial aldehydes, ketones, alcohols and phenols which are generated as a result of the desired cleavage of the compounds of formula I by skin bacteria, by enzymes, by elevated temperatures or by acidic and/or alkaline pH-values. The skilled person is, however, quite aware of those aldehydes, ketones and alcohols which provide the desired organoleptic, e.g. fragrance and odour masking and/or antimicrobial effects.

The compounds of formula I may preferably be used as sustained release odorants but also to mask or attenuate undesirable odours or to provide additional odours not initially present in consumer products, i.e. personal care products such as cosmetic products destined for application to human skin such as underarm deodorants or antiperspirants or other deodorants contacting the body, or in hand lotions, baby powders, baby lotions, ointments, foot products, facial cleansers, body wipes, facial make-up, colognes, after-shave lotions, shaving creams, etc. Additional applications include laundry detergents, fabric softeners, fabric softener sheets, (automatic) dishwasher detergents and all purpose cleaners. Further applications are air fresheners and odorants, odour masking agents and/or antimicrobial agents.

The compounds I are also useful in the flavouring and aromatizing of cooked foods. Addition of the compounds of the invention either singly or as a mixture to a cake batter, e.g. a microwave cake batter, serves to impart appropriate baking aromas to the cake as it is heated in the microwave as well as impart flavouring in the finished product. Compounds I are also useful in the flavouring and aromatizing of beverages, e.g. hot beverages such as teas and instant beverages prepared by adding hot water to a powder. Compounds I can also act as slow release agents in acidic or alkaline beverages. Further these compounds are also useful for flavouring and aromatizing tobacco products, e.g. cigarettes.

The amount required to produce the desired, overall effect varies depending upon the particular compounds of formula I chosen, the product in which it will be used, and the particular effect desired.

For example, depending upon the selection and concentration of the compound chosen, when a compound of the formula I is added either singly or as a mixture, e.g. to a deodorant or laundry product composition at levels ranging from about 0.1 to about 10 % by weight, or most preferred about 0.25 to about 4 % by weight, an odorant, i.e. an

odoriferous, aldehyde, ketone or both, with or without alcohol in an "organoleptically effective amount" is released when the product is used. This newly formed odorant serves to enhance the odour of the product itself or of an fragrance present in the product.

Depending upon the selection and concentration of the compounds I used, addition of the compounds I either singly or as a mixture to cigarette tobacco at levels ranging from about 5 ppm to about 50'000 ppm tends to enhance the smoking flavour and/or mask undesirable smoking odours. An important property of these compounds I is that the flavourant or odorant is covalently bound as a non-volatile compound and that the flavourant or odorant is released only when the tobacco product is ignited and burns.

Addition of the compounds of formula I either separately or as a mixture at levels suitably ranging from about 5 ppm to about 50'000 ppm by weight onto the media enclosing the tobacco serves to incorporate the odorant/flavourant in the side-stream smoke of the tobacco. Air borne flavourants and/or odorants are thus introduced. This newly formed odorant or flavourant serves to enhance or mask the smoking odours depending upon selection and use levels of the compounds I.

As is evident from the above compilation of aldehydes, ketones and alcohols, a broad range of known odorants or odorant mixtures can be generated from precursors of the invention. While manufacturing compositions the precursors of the invention may be used according to methods known to the perfumer, such as e.g. from W.A. Poucher, Perfumes, Cosmetics, Soaps, 2, 7th Edition, Chapman and Hall, London 1974.

The compounds of formula I can be prepared by using standard methods known to the skilled chemist. Enol esters of Example 1 may be prepared using the procedure of J. Chem. Soc., Perkin Trans. I, 2509 (1993).

Convenient methods are outlined in the Examples without limiting the invention thereto.

Example 1

a) Acetic acid 3-(4-tert-butyl-phenyl)-2-methyl-propenyl ester

A solution of 200 g 2-methyl-3-(4-tert-butylphenyl) propanal, 280 ml triethylamine and 13.4 g sodium acetate in 800 ml of acetic anhydride was stirred at 120°C for 5.5 hours. Then the solution was cooled, water was added and the water phase was extracted with hexane. The organic phase was washed with 2N NaOH and water to neutrality, dried and evaporated to dryness. The residue was distilled to yield 185 g of a colourless liquid.
NMR ($CDCl_3$) δ 7.35-6.97 (m, 5H), 3.43+3.21 (s, 2H, E/Z), 2.13 (s, 3H), 1.60 (s, 3H), 1.30 (s, 9H) ppm.

b) Acetic acid undeca-1,9-dienyl ester

According to the same procedure, acetic acid undeca-1,9-dienyl ester was prepared from undec-9-enal, acetic anhydride, sodium acetate and triethylamine.

c) Acetic acid 3-(3-isopropyl-phenyl)-but-1-enyl ester

According to the same procedure, acetic acid 3-(3-isopropyl-phenyl)-but-1-enyl ester was prepared from 3-(3-isopropylphenyl)butanal, acetic anhydride, sodium acetate and triethylamine.

d) Acetic acid 3-(4-isopropyl-phenyl)-2-methyl-propenyl ester

According to the same procedure, acetic acid 3-(4-isopropyl-phenyl)-2-methyl-propenyl ester was prepared from 2-methyl-3-(4-isopropyl-phenyl)-propionaldehyde, acetic anhydride, sodium acetate and triethylamine.

e) Acetic acid 2,6,10-trimethyl-undeca-1,9-dienyl ester

According to the same procedure, acetic acid 2,6,10-trimethyl-undeca-1,9-dienyl ester was prepared from 2,6,10-trimethylundec-9-enal, acetic anhydride, sodium acetate and triethylamine.

f) Acetic acid 2,6-dimethyl-hepta-1,5-dienyl ester

According to the same procedure, acetic acid 2,6-dimethyl-hepta-1,5-dienyl ester was prepared from 2,6-dimethyl-hept-5-eneal, acetic anhydride, sodium acetate and triethylamine.

g) Acetic acid 2-(3,7-dimethyl-oct-6-enyloxy)-vinyl ester

According to the same procedure, acetic acid 2-(3,7-dimethyl-oct-6-enyloxy)-vinyl ester was prepared from [(3,7-dimethyl-6-octenyl)oxy]-acetaldehyde, acetic anhydride, sodium acetate and triethylamine.

Example 2

a) Carbonic acid butyl ester 3-(4-tert-butyl-phenyl)-2-methyl-propenyl ester

A solution of 40.0 g acetic acid 3-(4-tert-butylphenyl)-2-methyl-propenyl ester in 250 ml of THF was cooled to

-70°C. A solution of 25.0 g potassium-tert-butoxide in 100 ml of THF was added at -70°C during 35 min. and the resulting reaction mixture was stirred for 60 min. at the same temperature. 23.3 g butyl-chloroformate was dropped in during 40 min. and the reaction mixture was stirred for another 90 min. at-70°C. Then the reaction mixture was diluted with ether, washed with saturated $NaHCO_3$ and brine. The organic phase was dried, filtered and evaporated to dryness. The residue was thin-layer distilled and purified by chromatography to yield a colourless oil.
NMR ($CDCl_3$) δ 7.35-7.06 (m, 4H), 6.86+6.80 (s, 1H, E/Z), 4.21 (t, 2H), 3.43+3.22 (s, 2H E/Z), 1.79-1.34 (m, 7H), 1.31 (s, 9H), 0.96 (t, 3H) ppm.

b) Carbonic acid benzyl ester undeca-1,9-dienyl ester

According to the same procedure, carbonic acid benzyl ester undeca-1,9-dienyl ester was prepared from acetic acid undeca-1,9-dienyl ester and benzyl chloroformate.

c) Carbonic acid benzyl ester 3-(4-tert-butyl-phenyl)-2-methyl-propenyl ester

According to the same procedure, carbonic acid benzyl ester 3-(4-tert-butyl-phenyl)-2-methyl-propenyl ester was prepared from acetic acid 3-(4-tert-butyl-phenyl)-2-methyl-propenyl ester and benzyl chloroformate.

d) Carbonic acid benzyl ester 3-(3-isopropyl-phenyl)-but-1-enyl ester

According to the same procedure, carbonic acid benzyl ester 3-(3-isopropyl-phenyl)-but-1-enyl ester was prepared from acetic acid 3-(3-isopropyl-phenyl)-but-1-enyl ester and benzyl chloroformate.

Example 3

a) Carbonic acid 3-(4-tert-butyl-phenyl)-2-methylpropenyl ester 2-(2-[3-(4-tert-butyl-phenyl)-2-methylpropenyloxy-carbonyloxy]-ethoxy)-ethyl ester

A solution of 40.2 g acetic acid 3-(4-tert-butylphenyl)-2-methyl-propenyl ester in 200 ml of THF was cooled to -70°C. A solution of 24.6 g potassium-tert-butoxide in 200 ml of THF was added at -70°C during 30 min. and the resulting reaction mixture was stirred for 90 min. at the same temperature. 18.7 g diethylene glycol bis chloroformate was dropped in and the reaction mixture was stirred for another 90 min. at-70°C. Then the reaction mixture was diluted with ether, washed with saturated $NaHCO_3$ and brine. The organic phase was dried, filtered and evaporated to dryness. The residue was thin-layer distilled to yield 23.6 g of a viscous yellow oil.
NMR ($CDCl_3$) δ 7.35-7.07 (m, 8H), 6.84+6.79 (s, 1H, E/Z), 4.40-4.28 (m, 4H), 3.83-3.66 (m, 4H), 3.42+3.22 (s, 4H, E/Z), 1.65-1.45 (m, 6H), 1.30 (s, 18H) ppm.

b) Carbonic acid 3- (4-iospropyl-phenyl) -2-methyl-propenyl ester 2-(2-[3-(4-isopropyl-phenyl)-2-methylpropeny-loxycarbonyloxy]-ethoxy}-ethyl ester

According to the same procedure carbonic acid 3-(4-isopropyl-phenyl)-2-methyl-propenyl ester 2-{2-[3-(4-iso-propyl-phenyl)-2-methyl-propenyloxycarbonyloxy]-ethoxy}-ethyl ester was prepared from acetic acid 3-(4-isopro-pyl-phenyl)-2-methyl-propenyl ester and diethylene glycol bis chloroformate.

c) Carbonic acid 3-(3-isopropyl-phenyl)-but-1-enyl ester 2-(2-[3-(3-isopropyl-phenyl)-but-1-enyloxycarbonyloxy]-ethoxy}-ethyl ester

According to the same procedure cabonic acid 3-(3-isopropyl-phenyl)-but-1-enyl ester 2-{2-[3-(3-isopropyl-phenyl)-but-1-enyloxycarbonyloxy]-ethoxy}-ethyl ester was prepared from acetic acid 3-(3-isopropyl-phenyl)-but-1-enyl ester and diethylene glycol bis chloroformate.

d) Carbonic acid undeca-1,9-dienyl ester 2-(2-undeca-1,9-dienyloxycarbonyloxy-ethoxy)-ethyl ester

According to the same procedure carbonic acid undeca-1,9-dienyl ester 2-(2-undeca-1,9-dienyloxycarbony-loxyethoxy)-ethyl ester was prepared from acetic acid undeca-1,9-dienyl ester and diethylene glycol bis chlorofor-mate.

e) Carbonic acid 2,6,10-trimethyl-undeca-1,9-dienyl ester 2-[2-(2,6,10-trimethyl-undeca-1,9-dienyloxycarbony-loxy)-ethoxy]-ethyl ester

According to the same procedure, carbonic acid 2,6,10-trimethyl-undeca-1,9-dienyl ester 2-[2-(2,6,10-trime-thyl-undeca-1,9-dienyloxy-carbonyloxy)-ethoxy]-ethyl ester was prepared from acetic acid 2,6,10-trimethyl-unde-ca-1,9-dienyl ester and diethylene glycol bis chloroformate.

f) Carbonic acid 2,6-dimethyl-hepta-1,5-dienyl ester 2-[2-(2,6-dimethyl-hepta-1,5-dienyloxycarbonyloxy)-ethoxy]-ethyl ester

According to the same procedure, carbonic acid 2,6-dimethyl-hepta-1,5-dienyl ester 2-[2-(2,6-dimethylhepta-1,5-dienyloxycarbonyloxy)-ethoxy]-ethyl ester was prepared from acetic acid 2,6-dimethyl-hepta-1,5-dienyl ester and diethylene glycol bis chloroformate.

g) Carbonic acid 2-(3,7-dimethyl-oct-6-enyloxy)-vinyl ester 2-(2-[2-(3,7-dimethyl-oct-6-enyloxy)-vinyloxycarbonyloxy]-ethoxy}-ethyl ester

According to the same procedure, carbonic acid 2-(3,7-dimethyl-oct-6-enyloxy)-vinyl ester 2-{2-[2-(3,7-dimethyl-oct-6-enyloxy)-vinyloxycarbonyloxy]-ethoxy}ethyl ester was prepared from acetic acid 2-(3,7-dimethyl-oct-6-enyloxy)-vinyl ester and diethylene glycol bis chloroformate.

Example 4

Test cloth was washed with a lipase-containing detergent to which one or more of the precursors of Examples 2 and 3 had been added. Headspace analysis of the wet and dry laundry indicated the presence of the fragrances. The fragrance level was higher than when the test cloth was washed with a lipase-containing detergent to which one or more fragrances were added.

Example 5

Test cloth was washed with a lipase-containing detergent and then a fabric softener, containing one or more of the precursors of Examples 2 and 3 was added to the rinse cycle. Headspace analysis of the wet and dry laundry indicated the presence of the fragrances. The fragrance level was higher than when the test cloth was washed with a lipase-containing detergent and then a fabric softener, containing one or more fragrances, was added to the rinse cycle.

Example 6

Axilla bacteria cultures containing 0.1 % of one or more of the precursors of Examples 2 and 3 were incubated for 20 hours at 30°C. After filtration from the cells, the presence of the corresponding fragrance was in each case detected by headspace-GC techniques and/or the majority of an 18 member panel.

The same tests were carried out with inactivated cultures (85°C/20 min.). The odour of the corresponding fragrance could not be detected after incubation, excluding therefore a hydrolysis by the medium or the culture.

Example 7

The following set forth examples for the use of the compounds of the present invention in various products. The methods of forming the following compositions are well known to those skilled in the art. All formulations may contain additional ingredients known to those skilled in the art, e.g. colorants, opacifiers, buffers, antioxidants, vitamins, emulsifiers, UV absorbers, silicones and the like. All products can also be buffered to the desired pH. All values are % w/w. Delayed Release Fragrances stands in the following for compounds of Examples 2 and 3.

a) Deo-colognes				
Delayed Release Fragrances	0.5	1.5	2.5	6.0
Fragrance	0.5	1.5	2.5	6.0
Triclosan (Ciba Geigy)	1.0	-	0.75	1.0
Alcohol to	100	100	100	100

b) Deo-Sticks	
Antiperspirant	
Ethylene Glycol Monostearate	7.0
Shea butter	3.0
Neobee 1053 (PVO International)	12.0
Generol 122 (Henkel)	5.0
Kesscowax B (Akzo)	17.0
Dimethicone Dow Corning 345	35.0

(continued)

b) Deo-Sticks	
Aluminum Sesquichlorhydrate	20.0
Delayed Release Fragrances	0.5
Fragrance	0.5
Antiperspirant	
Steary Alcohol	17.0
Castor Wax	3.0
Talc	5.0
Aluminum Zirconium Tetrachlorhydrate	20.0
Delayed Release Fragrances	1.0
Fragrance	1.0
Dimethicone Dow 245	to 100.0
Clear Deodorant Stick	
Witconol APM	43.0
Propylene Glycol	20.0
Alcohol 39C	20.0
Demin Water	7.0
Monamid 150ADD	5.0
Millithix 925	2.0
Ottasept Extra	0.5
Delayed Release Fragrances	0.75
Fragrance	0.75
Deodorant Stick	
Propylene Glycol	69.0
Demin Water	21.8
Triclosan	0.2
Sodium Stearate	8.0
Delayed Release Fragrances	0.5
Fragrance	0.5
Alcohol free Deodorant Stick	
PPG-3 Myristyl Ether	
(Witconol APM)	36.0
Propylene Glycol	36.0
Demin Water	19.0
Triclosan	0.25
Sodium Stearate	7.75
Delayed Release Fragrances	0.5
Fragrance	0.5
Antiperspirant Aerosol	
Absolute Ethanol	15.0
Zirconium Aluminum tetrachlorhydrate	5.0
Bentone 38	1.5
Delayed Release Fragrances	0.75
Fragrance	0.75
S-31 Hydrocarbon propellant to	100.0

(continued)

b) Deo-Sticks	
Antiperspirant Pump	
Demin Water	57.5
Aluminum Sesquichlorhydrate	20.0
Triton X-102 (Union Carbide)	2.0
Dimethyl Isosorbide (ICI)	20.0
Delayed Release Fragrances	0.25
Fragrance	0.25
Roll-On	
Dimethicone DC 354 (Dow Corning)	69.0
Bentone 38	10.0
Rezal 36 GP (Reheis Chem. Co.)	20.0
Delayed Release Fragrances	0.5
Fragrance	0.5

In the above examples, the following components were used:

Triclosan	5-chloro-2-(2,4-dichlorophenoxy)phenol
Neobee 1053	glycerol tricaprate/caprylate
Generol 122	soya sterol
Kesscowax B	cetyl alcohol and glycol polymer
Witconol APM	polypropylene glycol-3 myristyl ether
Monamid 150 ADD	cocoamide diethanolamine
Millithix 925	dibenzylidene sorbitol
Ottasept Extra	quaternium 18 hectorite
Bentone 38	quaternium 18 hectorite
Triton X-102	octoxynol-13
Dimethicone DC 354	mixture of fully methylated linear siloxanepolymers endblocked with trimethylsiloxy units
Rezal 36 GP	Aluminum zirconium tetrachlorohydrexglycine

Example 8

A 1% solution of one or more of the products of Examples 3a, b, c and d in ethanol was applied to cigarette papers to produce levels of 5-50'000 ppm of each flavourant. The paper was incorporated in cigarettes and, upon burning, released a fragrant odor.

Example 9

a) Fabric softener of the ester quat type (4 x concentrate):

INGREDIENTS	CHEMICAL NAME	%
PHASE A		
DEIONISED WATER		to 100.0
$MgCl_2$ (saturated sol.)	Magnesium chloride	1.0
PHASE B		
REWOQUAT WE 18	Di-(tallow carboxyethyl)hydroxy ethyl methylammonium methosulfate	15.0
GENAPOL O 100	Ethoxylated fatty alcohol C16-C18 10EO	2.0

(continued)

INGREDIENTS	CHEMICAL NAME	%
PHASE B		
ANTIFOAM DB 31		0.5
PHASE C		
ISOPROPYL ALCOHOL PRESERVATIVE PERFUME		3.0 Qs Qs

PROCESS:

While stirring and heating to 65° C, mix part A, then part B preheated to 65° C. After cooling to room temperature, add part C.
The pH value of the finished product is 2.60.
Recommended level of perfume is 1.0 %. Delayed release fragrances from Examples 2 and 3 can be any part of this 1.0 %.

b) Fabric softener of the ester quat type (1 x concentrate):

INGREDIENTS	CHEMICAL NAME	%
PHASE A		
DEIONISED WATER		to 100.0
PHASE B		
REWOQUAT WE 18 DOBANOL 25-9 ANTIFOAM DB 31	Di-(tallow carboxyethyl)hydroxy ethyl methylammonium methosulfate Ethoxylated fatty alcohol C12-C15 9EO	6.0 0.50 0.10
PHASE C		
MYACIDE BT 30 PROXEL GXL PERFUME	2-bromo-2-nitropropane 1,3 diol Benzisothiazolinone sodium salt	0.03 0.02 Qs

PROCESS:

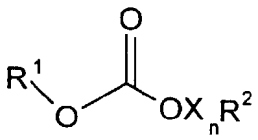
While stirring and heating to 65° C, mix part A, then part B preheated to 65° C. After cooling to room temperature, add part C.

The pH value of the finished product is 3.50.

Recommended level of perfume: 0.3 %. Delayed release fragrances from examples 2 and 3 can be any part of this 0.3 %.

Claims

1. Compounds of formula I



(I)

wherein

R^1 represents the residue of the enol form of an aldehyde or ketone,

R^2 represents a saturated or unsaturated, substituted or unsubstituted C_1-C_{30} aliphatic residue with straight or branched chaines a saturated or unsaturated, substituted or unsubstituted carbocyclic or heterocyclic residue optionally having one or more heteroatoms in the chain, the residue of the enol form of an aldehyde or ketone, the residue of an alcohol or phenol, -COOY or -OCOOY, wherein Y is H, a metal atom or R^3, and R^3 is the rest of an alcohol or phenol R^3OH or has the same definition as R^1 and is the same or different as R^1,

X represents a saturated or unsaturated bivalent hydrocarbon residue with a straight or branched chain with 1 to 30 carbon atoms optionally containing one or more heteroatoms and/or a group

and/or substituents of the formula -COOY, -OCOOY, -OH, -C=O, or $-NH_2$ and Y is H, a metal atom or R^4, and R^4 is the rest of an alcohol or phenol R^4OH or has the same definition as R^1 and is the same or different as R^1 and

n is 0 or 1.

2. Compounds according to claim 1, which are cleaved by skin bacteria, enzymes, elevated temperature or by acidic or alkaline pH values into one or more organoleptic and/or antimicrobial compounds.

3. Compounds according to claim 2, whereby the enzymes are protease or lipase.

4. Compounds according to any of the preceeding claims, being a fragrance precursor.

5. Compounds according to any of the preceeding claims, being a flavor precursor.

6. Compounds according to any of the preceeding claims, being a precursor for an organoleptic masking agent.

7. Compounds according to any of the preceeding claims, being a precursor for an antimicrobial agent.

8. Compounds according to any of the preceeding claims, wherein the substituents R^1, R^2 and/or R^3 are different.

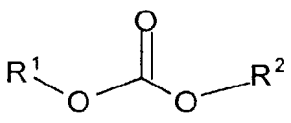
9. Compounds of any of the claims 1 to 7, wherein R^1 and R^2 or R^1 and R^3 are the same.

10. Compounds according to any of the preceeding claims, wherein the heteroatoms in X are O, N, S and/or P.

11. Compounds according to any of the preceeding claims, wherein R^3 is the residue of an organoleptic alcohol or phenol.

12. Compounds according to any of the preceeding claims, wherein R^2 is an C_1-C_{30} aliphatic residue substituted by an anionic or cationic group.

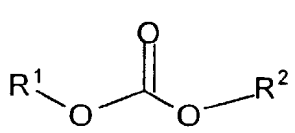
13. Compounds according to any of the claims 1 to 9 of formula II



(II)

wherein R^1 has the same meaning as in claim 1, and R^2 is the residue of the enol form of an aldehyde or ketone or the residue of an alcohol or phenol and R^1 and R^2 may be different or the same.

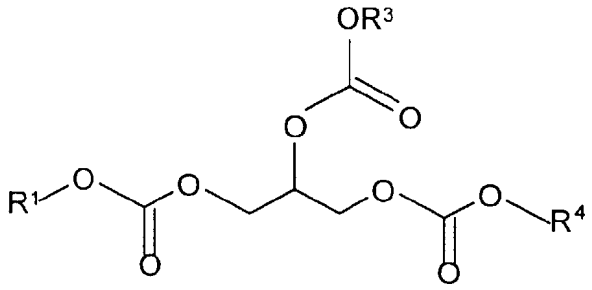
14. Compounds according to any of the claims 1 to 8 of formula II



(II)

wherein R^1 has the same meaning as in claim 1 and R^2 is an alkyl residue.

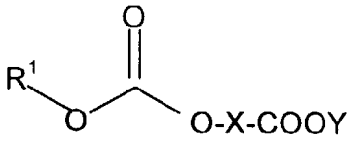
15. Compounds according to any of the claims 1 to 11 of formula III



(III)

wherein R^1, R^3 and R^4 have the same meaning as in claim 1, whereby R^1, R^3 and R^4 may be the same or different.

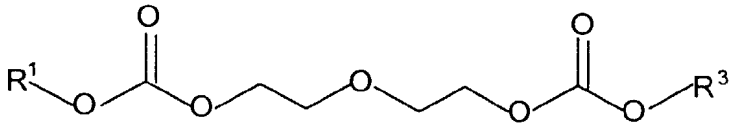
16. Compounds according to any of the claims 1 to 11 of formula IV



(IV)

wherein X represents a saturated or unsaturated bivalent hydrocarbon with a straight or branched chain with 1 to 20 carbon atoms and R^1 and Y have the same meaning as in claim 1.

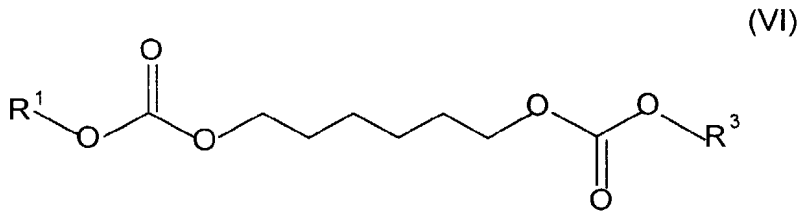
17. Compounds according to any of the claims 1 to 11 of formula V



(V)

wherein R^1 and R^3 are as defined in claim 1.

18. Compounds according to any of the claims 1 to 11 of formula VI



(VI)

wherein R^1 and R^3 have the same meaning as in claim 1.

19. a) Carbonic acid 3-(4-tert-butyl-phenyl)-2-methylpropenyl ester 2-{2-[3-(4-tert-butyl-phenyl)-2-methyl-propenyloxycarbonyloxy]-ethoxy}-ethyl ester.

b) Carbonic acid 3-(3-isopropyl-phenyl)-but-1-enyl ester 2-{2-[3-(3-isopropyl-phenyl)-but-1-enyloxycarbonyloxy]-ethoxy}-ethyl ester.

c) Carbonic acid undeca-1,9-dienyl ester 2-(2-undeca-1,9-dienyloxycarbonyloxy-ethoxy)-ethyl ester.

d) Carbonic acid 3-(4-isopropyl-phenyl)-2-methylpropenyl ester 2-{2-[3-(4-isopropyl-phenyl)-2-methyl-propenyloxycarbonyloxy]-ethoxy}-ethyl ester.

e) Carbonic acid 2,6-dimethyl-hepta-1,5-dienyl ester 2-[2-(2,6-dimethyl-hepta-1,5-dienyloxy carbonyloxy)-ethoxy]-ethyl ester.

f) Carbonic acid 2,6,10-trimethyl-undeca-1,9-dienyl ester 2-[2-(2,6,10-trimethyl-undeca-1,9-dienyloxycarbonyloxy)-ethoxy]-ethyl ester.

g) Carbonic acid 2-(3,7-dimethyl-oct-6-enyloxy)-vinyl ester 2-{2-[2-(3,7-Dimethyl-oct-6-enyloxy)-vinyloxycarbonyloxy]-ethoxy}-ethyl ester.

h) Carbonic acid butyl ester 3 (4-tert-butyl-phenyl)-2-methyl-propenyl ester.

i) Carbonic acid benzyl ester 3-(4-tert-butylphenyl)-2-methyl-propenyl ester.

k) Carbonic acid benzyl ester 3-(3-isopropyl-phenyl)-but-1-enyl ester.

l) Carbonic acid benzyl ester undeca-1,9-dienyl ester.

as compounds according to claim 1.

20. Use of the compounds of any of the claims 1 to 19 in personal care products.

21. Use of the compounds of any of the claims 1 to 19 in laundry products.

22. Use of the compounds of any of the claims 1 to 19 in all purpose cleaners.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 81 0541

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	FR 2 603 886 A (SOCIETE NATIONALE DES POUDRES ET EXPLOSIFS) 18 March 1988 * page 2, line 6 - page 3, line 6 * * page 3, line 21 - page 4, line 33 * * page 6, line 4 - line 20 * * page 10 - page 23; examples * * page 24 - page 28; claims *	1,8,13, 14,18	C07C69/96 C11D3/50

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

C07C
C11D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	17 September 1998	Kinzinger, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
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